

acetic or butyric acid. The general result of the various cultures was that in the first case the sporelings developed normally; in the second, no sporelings appeared; while in the third, sporelings developed up to the 25-cell stage. The experiments were not carried farther. No cytological work was done. Since the *Fucus* plant is the 2x generation, it would be interesting to know the chromosome situation, especially if the plants should develop up to the reproductive phase.—CHARLES J. CHAMBERLAIN.

Chromosome conjugation.—Miss FRASER,¹⁶ in a short discussion of chromosome conjugation, cites the work of OVERTON, HARPER, DIGBY, and others to show that it is not a matter of primary importance whether parasynapsis or telosynapsis takes place, and that they need not be mutually exclusive. The sexual nuclei may fuse at once upon fertilization, or not until the division of the oospore in other cases (Pinaceae); while in the extreme case of the rusts they remain distinct until just before meiosis. In like manner the attraction between the homologous chromosomes may bring about their conjugation as soon as the nuclei fuse, or in other cases later, even as late as the formation of the gemini of maturation. The suggestion is made that the clearest cases of Mendelian inheritance will perhaps be found to be those correlated with a late association of the chromosomes in pairs.—L. W. SHARP.

1 **Flora of Boulder.**—DANIELS¹⁷ has made a study of the vascular flora of Boulder, Colo., and vicinity, a most interesting mountain region. An introduction (48 pp.) describes the physiography, the climate and rainfall, and the zones of vegetation. The zones given are Campestris, Mensales, Submontanae, Montanae, Subalpestres, and Alpestres, each with numerous subdivisions. The list of plants (211 pp.) includes 1225 numbers in 486 genera, with a statement as to the habitat of each species. A number of new combinations are made, and new species described in *Acomastylis* (*Geum*), *Prunus*, *Vitis*, *Castilleja*, and *Grindelia*. One of the unique features of the list is that a popular name is given for each species. When this reaches such a stage as "filiform toad-flax-leaved painted cup," it is probable that it ceases to be useful.—J. M. C.

Graft hybrids.—Miss HUME¹⁸ has investigated three graft hybrids for connecting protoplasmic threads. The "periclinal chimaeras" used were *Cytisus Adami*, *Solanum tubingense*, and *S. Kolereuterianum*, since in these the epidermis is the only layer of cells belonging to the one component, and the line of demarcation between the two components is therefore a sharp one. BUDER

¹⁶ FRASER, H. C. I., The pairing of the chromosomes. *New Phytol.* 11:58-60. 1912.

¹⁷ DANIELS, FRANCIS POTTER, The flora of Boulder, Colorado, and vicinity. *Univ. Missouri Studies. Science Series* 2: no. 2. pp. xiii+311. 1911.

¹⁸ HUME, MARGARET, On the presence of connecting threads in graft hybrids. *New Phytol.* 12:216-221. 1913.